

WHAT IS CLAIMED IS:

- Fig. 2
1. An integrated circuit device comprising:
- an output terminal for connection with a terminal of an
- 5 external load;
- first and second power supply terminals for connection with a terminal of an external power supply;
- a switching element connected between the output terminal and the first power supply terminal, wherein the switching
- 10 element, the external load, and the external power supply form a load current flow path;
- an impedance circuit connected between the output terminal and the second power supply terminal;
- an abnormality detection circuit for monitoring a voltage at
- 15 the output terminal, and detecting an abnormal condition on the basis of the monitored voltage; and
- a drive control circuit for driving and controlling the switching element.
- Fig. 3
- 20 2. An integrated circuit device comprising:
- first and second output terminals for connection with a terminal of an external load;
- a power supply terminal for connection with a terminal of an external power supply;
- 25 a switching element connected between the first output terminal and the power supply terminal, wherein the switching

element, the external load, and the external power supply form a load current flow path;

an impedance circuit connected between the second output terminal and the power supply terminal;

5 an abnormality detection circuit for monitoring a voltage at the first and second output terminals, and detecting an abnormal condition on the basis of the monitored voltage; and

a drive control circuit for driving and controlling the switching element.

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3. An integrated circuit device comprising:

a package having an output terminal for connection with a terminal of an external load, and a power supply terminal for connection with a terminal of an external power supply; and

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a chip hermetically provided in the package and having an output-purpose pad and first and second power-supply-purpose pads, the output-purpose pad being connected to the output terminal of the package, the first and second power-supply-purpose pads being connected to the power supply terminal of the package;

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wherein the chip comprises:

(1) a switching element connected between the output-purpose pad and the first power-supply-purpose pad, wherein the switching element, the external load, and the external power supply form a load current flow path;

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(2) an impedance circuit connected between the output-purpose pad and the second power-supply-purpose pad;

(3) an abnormality detection circuit for monitoring a voltage at the output-purpose pad, and detecting an abnormal condition on the basis of the monitored voltage; and

(4) a drive control circuit for driving and controlling the  
5 switching element.

4. An integrated circuit device comprising:

a package having an output terminal for connection with a terminal of an external load, and a power supply terminal for  
10 connection with a terminal of an external power supply; and

a chip hermetically provided in the package and having first and second output-purpose pads and a power-supply-purpose pad, the first and second output-purpose pads being connected to the output terminal of the package, the power-supply-purpose pad being  
15 connected to the power supply terminal of the package;

wherein the chip comprises:

(1) a switching element connected between the first output-purpose pad and the power-supply-purpose pad, wherein the switching element, the external load, and the external power supply  
20 form a load current flow path;

(2) an impedance circuit connected between the second output-purpose pad and the power-supply-purpose pad;

(3) an abnormality detection circuit for monitoring a voltage at the first and second output-purpose pads, and detecting an  
25 abnormal condition on the basis of the monitored voltage; and

(4) a drive control circuit for driving and controlling the

switching element.

5. An integrated circuit device comprising:

an output terminal for connection with a terminal of an  
5 external load;

a power supply terminal for connection with a terminal of an  
external power supply;

a switching element connected between the output terminal  
and the power supply terminal, wherein the switching element, the  
10 external load, and the external power supply form a load current  
flow path;

( an impedance circuit and a switch circuit connected in series  
between the output terminal and the power supply terminal;

an abnormality detection circuit for monitoring a voltage at  
15 the output terminal, and detecting an abnormal condition on the  
basis of the monitored voltage;

a drive control circuit for driving and controlling the  
switching element; and

a switch control circuit for setting the switch circuit in a  
20 closed state under a condition that the drive control circuit is fed  
with an operation-purpose power supply voltage.

6. An integrated circuit device as recited in claim 5, wherein the  
switch control circuit comprises means for setting the switch

25 circuit in the closed state when the operation-purpose power supply  
voltage is equal to or higher than a reference voltage.

7. An integrated circuit device as recited in claim 6, wherein the switch circuit comprises a transistor, and the switch control circuit comprises (1) a voltage divider for dividing the operation-purpose power supply voltage to get a division-resultant voltage, (2) a comparison circuit for comparing the division-resultant voltage and the reference voltage with each other, and (3) a drive circuit for driving the transistor in response to a comparison-result signal outputted from the comparison circuit.

8. An integrated circuit device as recited in claim 5, wherein the switch circuit comprises a transistor, and the switch control circuit comprises (1) means for dividing the operation-purpose power supply voltage to get a division-resultant voltage, and means for applying the division-resultant voltage to a control terminal of the transistor.

9. An integrated circuit device as recited in claim 1, wherein the impedance circuit comprises a resistor.

10. An integrated circuit device comprising:  
an output terminal for connection with a terminal of an external load;  
a power supply terminal for connection with a terminal of an external power supply;  
a switching element connected between the output terminal

and the power supply terminal, wherein the switching element, the external load, and the external power supply form a load current flow path;

an abnormality detection circuit for monitoring a voltage at  
5 the output terminal, and detecting an abnormal condition on the basis of the monitored voltage;

a drive control circuit for driving and controlling the switching element; and

a constant-current circuit connected between the output  
10 terminal and the power supply terminal for generating a constant current under a condition that the drive control circuit is fed with an operation-purpose power supply voltage.

11. An integrated circuit device as recited in claim 10, wherein  
15 the constant-current circuit comprises:

a current mirror circuit; and

a constant-current generation circuit connected to an input  
end of the current mirror circuit for outputting a constant current  
when being fed with the operation-purpose power supply voltage.

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12. An integrated circuit device as recited in claim 10, wherein  
the constant-current circuit comprises:

a current mirror circuit;

a constant-current generation circuit for feeding a constant  
25 current to an input end of the current mirror circuit; and

a current control circuit for applying a current output

suspension signal to a common control terminal of the current mirror circuit when the operation-purpose power supply voltage is equal to or lower than a reference voltage.

5     13.   An integrated circuit device as recited in claim 10, further comprising a protective resistor connected between the output terminal and the constant-current circuit.

10     14.   An integrated circuit device comprising:  
          a circuit board having a wiring pattern;  
          an integrated circuit having an output terminal for connection with a terminal of an external load, and first and second power supply terminals for connection with a terminal of an external power supply, the first and second power supply terminals being  
15     separated and disconnected from each other when the integrated circuit is separated from the circuit board, the first and second power supply terminals being connected to each other by the wiring pattern of the circuit board when the integrated circuit is mounted on the circuit board;  
20           a switching transistor contained in the integrated circuit and being connected between the output terminal and the first power supply terminal, wherein the switching transistor, the external load, and the external power supply form a load current flow path; and  
          a pull-down resistor contained in the integrated circuit and  
25     being connected between the output terminal and the second power supply terminal.

15. An integrated circuit device as recited in claim 14, wherein the integrated circuit comprises an abnormality detection circuit for monitoring a voltage at the output terminal, and detecting an  
5 abnormal condition in response to the monitored voltage.

16. An integrated circuit device comprising:  
a circuit board having a wiring pattern;  
an integrated circuit having first and second output terminals  
10 for connection with a terminal of an external load, and a power supply terminal for connection with a terminal of an external power supply, the first and second output terminals being separated and disconnected from each other when the integrated circuit is separated from the circuit board, the first and second output  
15 terminals being connected to each other by the wiring pattern of the circuit board when the integrated circuit is mounted on the circuit board;

a switching transistor contained in the integrated circuit and being connected between the first output terminal and the power  
20 supply terminal, wherein the switching transistor, the external load, and the external power supply form a load current flow path; and

a pull-down resistor contained in the integrated circuit and being connected between the second output terminal and the power supply terminal.

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17. An integrated circuit device as recited in claim 16, wherein



the integrated circuit comprises an abnormality detection circuit for monitoring a voltage at the first and second output terminals, and detecting an abnormal condition in response to the monitored voltage.

1. A method of detecting an abnormal condition in a system, comprising:  
monitoring a voltage at a first output terminal and a second output terminal;  
detecting an abnormal condition in response to the monitored voltage.